

Remarks

Claims 1-63, as originally filed, are pending in this application. In an Office Action dated December 17, 2004, the Examiner rejected claims 1-2, 13-23, 34-44 and 55-63 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,732,124 to Koseki *et al.* (Koseki) in view of U.S. Patent No. 6,678,704 to Bridge, Jr. *et al.* (Bridge). The Examiner objected to claims 3-12, 24-33 and 45-54 as depending from a rejected base claim. The Examiner also objected that the title was not descriptive. Applicants respectfully disagree with the Examiner's rejections and request reconsideration in light of the following arguments.

Claim 1 provides a method including recording a plurality of write commands in a forward journal. A virtual recovery mapping object is generated from the plurality of write commands. The virtual recovery mapping object maps logical addresses into physical storage addresses. A plurality of backward moves are generated from the write commands. The backward moves correspond to reverse changes that reverse the effect of the plurality of write commands. The virtual recovery mapping object is correlated with the plurality of backward moves so that the virtual recovery mapping object maps logical addresses to corresponding backward moves from the plurality of backward moves.

The Examiner rejected claim 1 as an obvious combination of Koseki and Bridge. However, as constructed by the Examiner, neither reference discloses Applicants' invention.

Claim 1 first provides for recording write commands in a forward journal. The Examiner asserts that this is disclosed by Koseki at column 5, lines 14-16, reproduced as follows:

(c) a plurality of metadata volumes, created in the secondary storage subsystem, which store a plurality of metadata objects describing files;

Koseki discloses what is meant by metadata at column 1, lines 43-48, reproduced as follows:

Besides handling files themselves, the file systems have to manage what is called "metadata." The term "metadata," denoting "data about data" literally, refers herein to such data that describes the location, size, and other information about each file stored in a computer's secondary storage unit.

There is no teaching or suggestion that this metadata includes "write commands" as provided in claim 1.

Claim 1 also provides for generating a virtual recovery mapping object, mapping logical addresses into physical storage addresses, from the plurality of write commands. The Examiner admits that Koseki does not disclose Applicants' mapping, asserting instead that this is taught by Bridge at column 5, lines 45-60, reproduced as follows:

A method and system for reducing overhead associated with recovering after a failure. According to the method, a checkpoint value is maintained that indicates which records of a plurality of records have to be processed after the failure. The plurality of records contain change information that corresponds to a plurality of data blocks. A target checkpoint value is determined based on a desired number of data block reads that will be required during a redo phase of recovery. Changes contained in volatile memory are then written to nonvolatile memory to advance the checkpoint value to at least the target checkpoint value.

According to another aspect of the invention, the record associated with the checkpoint value is identified. If a particular record is determined to have been stored in nonvolatile memory before the record associated with the checkpoint value, then the particular record is not processed. However, if it is determined that the particular record was not stored to nonvolatile memory before the record associated with the checkpoint value, then the particular record is processed.

There is no disclosure of any kind related to mapping logical addresses into physical storage addresses in the passage cited by the Examiner.

Claim 1 further provides for generating from the write commands a plurality of backward moves corresponding to reverse changes that reverse the effect of the plurality of write commands. The Examiner asserts that this is disclosed by Bridge at column 6, lines 1-6, reproduced as follows:

According to another aspect of the invention, the target checkpoint value is determined by calculating a maximum number of records that should be processed after the failure. The maximum number of records is based on the desired number of data block reads that will be required during the redo phase of the recovery.

Once again, the passage cited by the Examiner bears no resemblance to the claim element. There is no teaching or suggestion here for backward moves that reverse the effects of

anything, let alone the metadata volumes previously identified by the Examiner as Applicants' write commands.

Claim 1 also provides for correlating the virtual recovery mapping object with the plurality of backward moves so that the virtual recovery mapping object maps logical addresses to corresponding backward moves from the plurality of backward moves. The Examiner asserts that this is disclosed by Koseki at column 5, lines 38-41, reproduced as follows:

- (i) a log buffer which stores the log records collected by the log collection unit; and
- (j) a log writing unit which transfers the log records from the log buffer to the log volume.

This passage neither teaches nor fairly suggests correlating anything, let alone a virtual recovery mapping object with backward moves.

The Examiner has failed to establish a prima facie case that claim 1 is obvious. Claims 2-21, which depend from claim 1, are therefore also patentable.

Independent claim 22 provides a computer program product in a computer readable medium including functional descriptive material that, when executed by a computer, enables the computer to recording a plurality of write commands in a forward journal, generate a virtual recovery mapping object from the plurality of write commands, generate a plurality of backward moves from the write commands, and correlate the virtual recovery mapping object with the plurality of backward moves so that the virtual recovery mapping object maps logical addresses to corresponding backward moves from the plurality of backward moves.

The Examiner rejected claim 22 using the same arguments used to reject claim 1. Claim 22 is patentable over Koseki and Bridge for the same reasons provided above for claim 1. Claims 23-42 depend from claim 22 and are therefore also patentable.

Independent claim 43 provides a data management appliance including means for recording a plurality of write commands in a forward journal, generating a virtual recovery mapping object from the plurality of write commands, generating a plurality of backward moves from the write commands, and correlating the virtual recovery mapping object with the plurality of backward moves so that the virtual recovery mapping object maps logical addresses to corresponding backward moves from the plurality of backward moves.

The Examiner rejected claim 43 using the same arguments as for claim 1. Claim 43 is patentable over Koseki and Bridge for the same reasons provided above for claim 1. Claims 44-63 depend from claim 43 and are therefore also patentable.

The title has been amended to more clearly point out the subject matter of Applicants' invention.

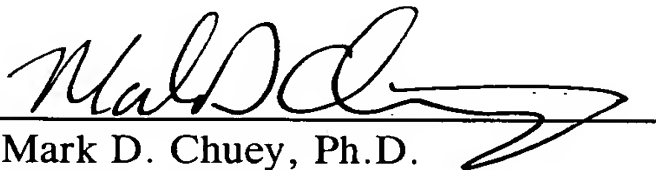
Claims 1-63, as originally filed, are pending in this application. Applicants believe these claims meet all substantive requirements for patentability and respectfully request that this case be passed to issuance.

Please charge the petition fee of \$120 for a one month extension of time to Deposit Account No. 19-4545 as specified in the Application Transmittal. Please charge any additional fees to Deposit Account No. 19-4545.

The Examiner is invited to contact the undersigned to discuss any aspect of this case.

Respectfully submitted,

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